

REMARKS/ARGUMENTS

Reconsideration and withdrawal of the rejections of the application are respectfully requested in view of the amendments and remarks herewith, which place the application into condition for allowance. The present amendment is being made to facilitate prosecution of the application.

I. STATUS OF THE CLAIMS AND FORMAL MATTERS

Claims 1-18 are currently pending. Claims 1, 12 and 18 are independent. Claims 1, 3, 12, 13 and 18 are hereby amended. No new matter has been introduced. Support for this amendment is provided throughout the Specification as originally filed, and specifically at page 10, line 23 to page 11, line 3. Changes to claims are not made for the purpose of patentability within the meaning of 35 U.S.C. §101, §102, §103, or §112. Rather, these changes are made simply for clarification and to round out the scope of protection to which Applicants are entitled.

II. REJECTIONS UNDER 35 U.S.C. §103(a)

Claims 1-7 and 9-18 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over U.S. Patent No. 6,332,030 to Manjunath et al.

Claim 8 was rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Manjunath et al. in view of U.S. Patent No. 5,915,027 to Cox et al.

Claim 1 recites, *inter alia*:

“An image processing apparatus...comprising...

a spatial domain form of said image...

wherein said data is introduced into at least one of said sub-bands in a scan direction, said at least one sub-band representing in said transform domain low spatial frequencies of said image in one direction and high spatial frequencies of said image in another direction, said scan direction being in the same direction in the sub-band as the direction of the low spatial frequencies of the image.”
(emphasis added)

As understood by Applicants, U.S. Patent No. 6,332,030 to Manjunath et al.

relates to a method for digital watermarking and, in particular, to a method for digital data hiding of significant amounts of data in images and video. The method employs a discrete wavelet transform for embedding gray scale images. A control parameter is used that can be tailored to either hiding or watermarking purposes, and is robust to operations such as JPEG compression.

As understood by Applicants, U.S. Patent No. 5,915,027 to Cox et al. relates to digital watermarking of data, including image, video and audio data, that is performed by repeatedly inserting the watermark into subregions or subimages of the data. Similarly, the watermark is repeatedly extracted from the subregions of the data.

However, there is no disclosure in Manjunath concerning a scan direction that is the same direction in the sub-band as the direction of the low spatial frequencies of the image, as recited in the last two lines of claim 1. Furthermore, claim 1 recites that the data is introduced into at least one of the sub-bands in the scan direction, the sub-band in the transform domain having low spatial frequencies of the image in one direction and high spatial frequencies of the image in another direction. Thus, in accordance with the advantages of the present invention, disclosed at page 3 and also at page 10, line 23 to page 11, line 3, of the Specification, writing

data into the sub-band in the same direction as the low frequency components of the image increases a likelihood of correctly detecting the embedded data as well as reducing a likelihood of the data being detectable by the human eye when the watermarked images are viewed. This is because writing the data in the scan direction, which is the same direction as the low spatial frequency components of the wavelet sub-band, introduces the data into the lower energy components of the image. As such, the strength of the embedded data can be reduced such that the effect on the image in the spatial domain can be less perceptible.

Accordingly, the present invention recognizes that the sub-band will have lower energy components in the lower spatial frequencies within that sub-band. Accordingly, by writing the data into the sub-band in the same direction as the low spatial frequency components, the data is combined with the lower energy components in the sub-band first, thereby reducing a likelihood of perceptually effecting the image in the spatial domain and increasing a likelihood of correctly recovering the data.

In contrast, Manjunath discloses in column 6, lines 30-32 that “inserting a signature in low frequency components creates problems if one is interested in invisible watermarks. This is particularly true in data hiding applications where the data to be hidden could be a significant percentage of the original data.” Accordingly, Manjunath teaches away from the present invention because claim 1 is limited to writing the data in a scan direction, which is the same direction of the low spatial frequency components. Furthermore, there is no indication of writing data in a particular scan direction into any of the sub-bands. As disclosed in column 11, line 4-11, each sub-band of the signature image is embedded into the corresponding sub-band of the host. Therefore, there is no selection of sub-bands into which the data is written.

Moreover, claim 1 recites that the data is introduced into at least one of the sub-bands in a scan direction. However, the direction of writing the data into the sub-band is specified with respect to the low and high frequency components. The scan direction is the same direction as the low spatial frequencies of the image, and therefore corresponds to writing data into the low/high sub-band. There is no suggestion in either Manjunath or Cox of such a limitation.

Applicants respectfully submit that Manjunath and Cox, taken either alone or in combination, fail to teach or suggest the above-identified features of claim 1. Therefore, Applicants submit that independent claim 1 is patentable.

For reasons similar to or somewhat similar to those described above with regard to independent claim 1, amended independent claims 12 and 18 are also believed to be patentable.

Therefore, Applicants submit that independent claims 1, 12 and 18 are patentable.

III. DEPENDENT CLAIMS

The other claims are dependent from one of the independent claims, discussed above, and are therefore believed patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

CONCLUSION

In the event the Examiner disagrees with any of statements appearing above with respect to the disclosure in the cited reference, or references, it is respectfully requested that the

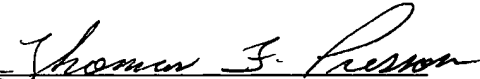
Examiner specifically indicate those portions of the reference, or references, providing the basis for a contrary view.

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In view of the foregoing amendments and remarks, it is believed that all of the claims in this application are patentable and Applicants respectfully request early passage to issue of the present application.

Respectfully submitted,

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